

Research article

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Reptiles and amphibians of the State of Kuwait

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Abstract. In this study, we identified the diversity of the freshwater, marine and terrestrial herpetofauna of the State of Kuwait. It consists of a total of 45 extant species; 44 species of reptiles and a single species of amphibian according to recent updated taxonomic studies. All specimens of reptiles collected and held in American and European natural history museums are documented. Four species are added to the herpetofauna of Kuwait: *Chalcides ocellatus*, *Hydrophis lapemoides*, *Hydrophis viperina*, and *Trapelus agnetae*.

Key words. Kuwait, herpetofauna, diversity, systematics, amphibians.

INTRODUCTION

The first study on the reptiles of Kuwait, published by Eissa & El Assy (1975), included 29 species. Clayton & Pilcher (1983) featured elaborate images of the reptiles of Kuwait covering some species. However, no localities were mentioned for the photographed reptiles.

Additional records of reptiles in Kuwait have been published within the past 15 years, including: the melanistic whip snake *Dolichophis jugularis* (Al-Mohanna et al. 2007); Murray's Comb-fingered Gecko *Stenodactylus affinis*, and Gulf Sand Gecko *Stenodactylus khobarensis* (Al-Sirhan 2009; Metallinou et al. 2012); the Web-footed Sand Gecko *Stenodactylus arabicus* (Delima and Al-Nasser, 2007); and the Small-spotted Desert Lizard *Mesalina guttulata* (Al-Sirhan 2008). Al-Sirhan & Brown (2010) gave an account on the distribution of two species of the genus *Phrynocephalus* in Kuwait.

The marine turtles of Kuwait have received much attention, with several studies on their taxonomy and biology (Gasperetti et al. 1993; Al-Mohanna & Meakins 1998, 2000a, 2000b; Meakins & Al-Mohanna 2000, 2003; Bishop et al. 2007; Bishop & Alsaffar 2008; Al Mohanna & George 2010; Al-Mohanna et al. 2013; Rees et al. 2013).

Other studies focused on the biology of some desert species (*Agama persica* = *Trapelus persicus* and *Diplometopon zarudnyi*) (Cloudsley-Thompson 1979).

Sey & Al-Ghaith (2000) examined the helminths of the green toad and the spiny tailed lizard in Kuwait. Several papers on the hematology of Kuwaiti lizards were published without giving localities for the studied material (Abdel-Fattah et al. 1974; Al-Badry 1975; Al-Badry et al. 1975; Al-Badry & Al-Sdirawi 1976). The impact of oil pollution on body size, weight, timing of morning emergence, basking and foraging behaviours and substrate preferences of *Acanthodactylus scutellatus* in Kuwait was investigated (Al-Hashem et al. 2008; Al-Hashem & Brain 2009a & b). Al-Sayegh (2017) conducted a study on its eco-physiological implications of conservation. A recent account on sea snakes of the Arabian Gulf with an illustrated key was published by Rezaie-Atagholipour et al. (2017).

The present study documents and updates previous records of the herpetofauna of Kuwait, adding reptile specimens collected from Kuwait and held in American and European natural history museums as well as recent observations.

MATERIAL AND METHODS

Geographical Setting

The total area of the State of Kuwait is 17,818 km² of land and about 1,000 km² of off-shore islands. It is situated in

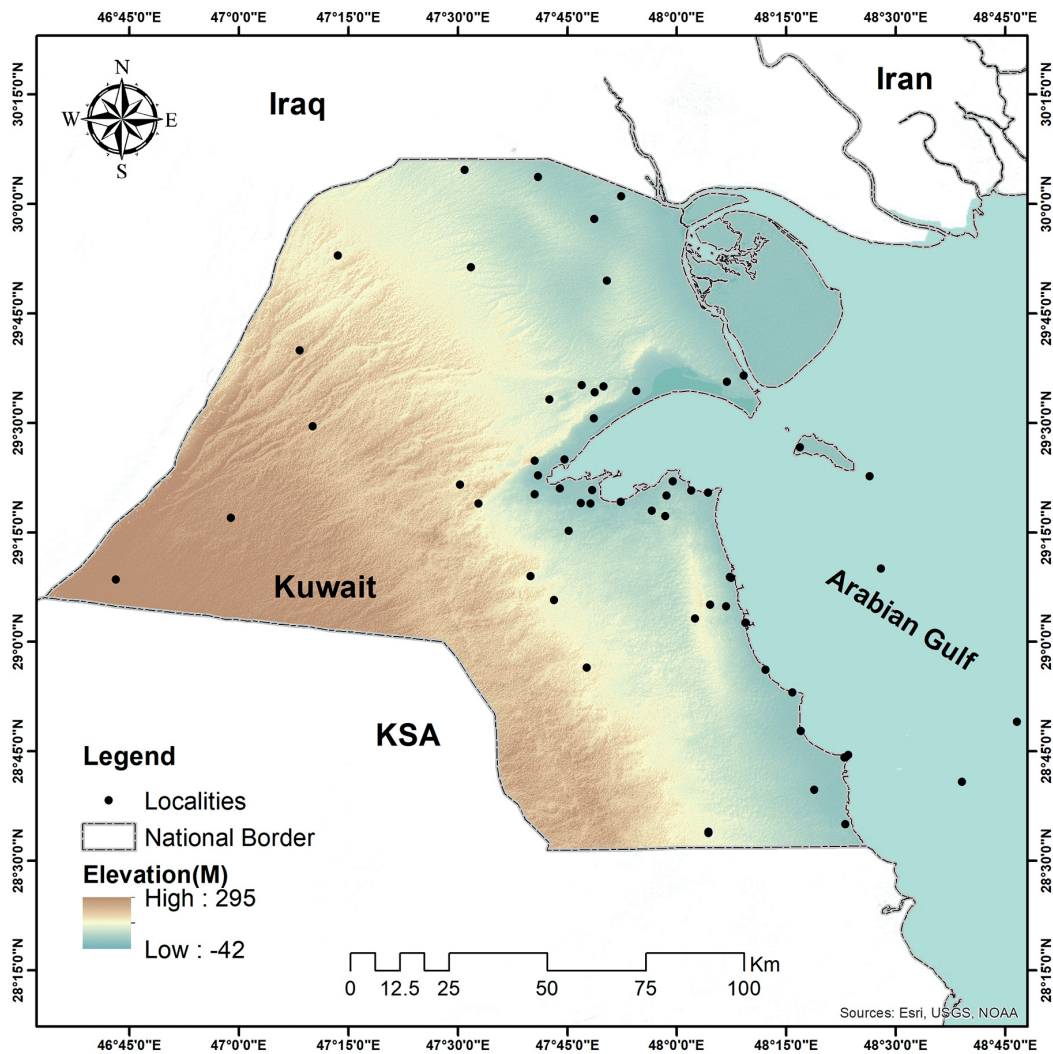


Fig. 1. Map of Kuwait showing localities from which materials were recorded.

Table 1. Natural history museums curating reptiles collected from Kuwait.

Abbreviation	Name of museum	No. of specimens
AMNH	American Museum of Natural History, New York, USA	3
BEV	Laboratoire de Biogéographie et Écologie des Vertébrés de l'École Pratique des Hautes Etudes, Montpellier, France	13
BMNH	British Museum of Natural History, London, UK	87
CAS	California Academy of Sciences, USA	2
CMNH	Carnegie Museum of Natural History, USA	1
FMNH	The Field Museum (Chicago), Illinois, USA	2
LAMC	Natural History Museum of Los Angeles County, California, USA	1
LSUMZ	Louisiana State University Museum of Natural Science, Louisiana, USA	17
SM	Senckenberg Museum, Frankfurt, Germany	1
FLMNH	Florida Museum of Natural History, Florida, USA	1
USNM	Smithsonian Museum of Natural History, Washington DC, USA	9
ZFMK	Zoologisches Forschungsmuseum Alexander Koenig, Bonn, Germany	1

Table 2. Localities indicated in the text and their coordinates.

Locality	N	E
Abdali	30°03'41.90"	47°40'59.60"
Abraj Khaitan	29°17'13.51"	47°58'26.42"
Agriculture Research Station	29°08'59.82"	47°39'57.70"
Ahmed Al Jaber Air Base	28°56'26.70"	47°47'38.40"
Al Abatih	29°51'18.20"	47°31'46.20"
Al Abraq	29°17'00.10"	46°58'54.50"
Al Ah'madi	29°05'05.28"	48°04'34.61"
Al Ah'madi Governorate	29°08'46.65"	48°07'26.28"
Al Asimah	29°20'02.50"	47°58'35.43"
Al Atrah	29°18'56.40"	47°32'50.81"
Al Dbaiyyah	28°56'09.70"	48°12'10.20"
Al Jahra East Outfall	29°21'00.38"	47°43'58.93"
Al Jahrah	29°20'11.65"	47°40'31.94"
Al Jalia	28°53'02.60"	48°15'51.50"
Al Liyah	29°29'32.13"	47°10'06.07"
Al Mutla	29°24'50.52"	47°40'33.27"
Al Nuwaiseeb	28°35'00.80"	48°23'06.60"
Al Ritqa	30°04'39.20"	47°30'54.60"
Al Salmi	29°08'33.10"	46°43'09.40"
Al Shlallal Farm	29°34'23.50"	47°54'28.20"
Al Subiya	29°35'36.48"	48°06'53.76"
Al Sugaihia	29°39'56.80"	47°08'18.60"
Al Wafrah	28°33'57.52"	48°04'20.73"
Al Wafrah New City	28°33'48.03"	48°04'21.77"
Ali Al Salem Air Force Base	29°21'31.40"	47°30'16.98"
Auhha Island	29°22'39.98"	48°26'25.66"
Benadier	28°47'46.70"	48°16'58.30"
Bodai's Farm	29°57'55.60"	47°48'42.90"
Burgan hills	29°03'10.34"	48°02'29.13"
Doha area	29°18'58.68"	47°48'12.35"
Failaka Island	29°26'40.04"	48°16'51.30"
Hawalli	29°20'43.06"	48°01'58.73"
Jal Az Zor	29°30'36.46"	47°48'38.95"
Judailiyat	29°19'00.06"	47°46'52.10"
Kabed	29°05'43.23"	47°43'09.79"
Kadma	29°24'58.30"	47°44'36.00"
Khiran	28°39'44.67"	48°18'49.82"
Khwaisat	29°22'48.10"	47°40'59.70"
Kuwait city	29°22'01.32"	47°59'25.81"
Mahboula	29°08'51.80"	48°07'15.3"
Mina Al Zour	28°44'08.60"	48°22'57.90"
Mina Said (Mina Al-Zour)	28°44'29.10"	48°23'30.50"

Locality	N	E
Mula'a Farm	29°33'12.07"	47°42'33.30"
N Bubiyan Bridge	29°36'28.06"	48°09'11.00"
N Sabriya	29°52'44.62"	47°52'49.71"
NW Kubber Island	29°10'00.90"	48°28'00.23"
Qaruh Island	28°49'03.20"	48°46'35.70"
Rabiya	29°17'57.53"	47°56'35.86"
Ras Salmiya	29°20'54.31"	48°05'50.35"
Rhawdatain	29°49'30.70"	47°50'25.55"
Sabah Al-Ahmad Natural Reserve	29°34'13.14"	47°48'44.67"
Salmiya	29°20'26.00"	48°04'17.00"
Shiggat Ai-Awazin	29°52'55.08"	47°13'32.90"
Shuaiba Industrial Area	29°02'36.79"	48°09'23.54"
Subahiya	29°04'52.00"	48°06'46.50"
Sulaibikhat Reserve	29°19'12.20"	47°52'19.90"
Sulaibiya Pivot Fields	29°15'12.60"	47°45'11.30"
Tulha	29°35'08.50"	47°46'59.40"
Umm Al-Maradim Island	28°40'48.46"	48°39'06.28"
Umm Niqa	30°01'04.10"	47°52'23.10"
Wadi Al-Tilha	29°35'00.92"	47°49'58.73"
Zayed Reserve	29°20'46.70"	47°48'23.10"

the most northwestern corner of the Arabian Gulf (Fig. 1). Kuwait is an arid country, consisting mainly of desert land. It is bordered by Saudi Arabia to the south and southwest and by Iraq to the north and northwest.

The landscape is relatively flat, broken only by occasional low sand dunes and shallow depressions. The surface rises gently from east to west reaching about 300 m above sea level at Al-Shigaya and Al-Salmi. The eastern part of the state, including all of the inhabited area, overlooks the Arabian Gulf along a coastline that extends for about 195 km. The surface consists of flat sandy plains interspersed with some low-rise hills, some of which reach a height of nearly 145 meters, and in northern Kuwait there is a series of hills such as Jal Al-Zour ridge, the hills of Al-Marw and Al-Liah. In the south, hills in the form of domes are common in the regions of Warah and Burgan. Sand dunes areas are mostly located in northwestern Kuwait along Al-Huwamiliyah-Al-Nimritayn zone reaching Al Atrah area. Kuwait is crossed by several dry desert wadi systems, such as Wadi Al-Batin, extending along the Kuwaiti-Iraqi borders about 150 km, and running along the western borders of Kuwait, with a width in some parts reaching about 10 km and a maximum depth of about 57 meters. To the north lies the Rawdatain Plain, consisting of flat land that slopes towards the east and the northeast (Fig. 2).



Fig. 2. Habitats in Kuwait. **A.** Water frontier on the Arabian Gulf. **B.** Al Jahrah Nature Reserve. **C.** Idrea'. **D.** Jal Al-Zour ridge (Photo by A. Alenezi). **E.** Khwaisat. **F.** Um Al Rimam (Photo by A. Alenezi).

Kuwait includes nine islands in the Arabian Gulf, the largest is Bubiyan Island (683 km²). The coastal strip extends for about 500 km, with a number of small bays and lagoons. The largest are Kuwait and the Kazma Bays, with several lagoons such as Abdullah, Boubyan, and Al Subiya khawrs in the north, and Al Maftah and Al Amma khawrs in the south.

Museum specimens, literature and additional records

Reptiles specimens held at American and European museums were obtained from the online catalogues databases or by communication with curators of museums known to have materials from the Middle East. We located 12 museums keeping reptiles collected from Kuwait

with a total of 137 specimens. The British Museum of Natural History, London, and the Louisiana State University Museum of Natural Science, Louisiana, USA, held the highest number of specimens (Table 1). All previously published records were extracted from published papers, and books. Additionally, new record localities from field observations are included. Table 2 lists all localities indicated in the text.

RESULTS

A total of 45 extant species – 44 species of reptiles belonging to 14 families (Cheloniidae, Dermochelyidae, Gekkonidae, Agamidae, Trogonophidae, Scincidae,

Lacertidae, Varanidae, Typhlopidae, Boidae, Colubridae, Psammophiidae, Viperidae and Elapidae) and a single species of amphibians of the family Bufonidae – are reported.

Amphibians

Family Bufonidae

This family of toads is represented by a single species, *Bufotes sitibundus*. Kuwait lacks natural freshwater bodies. Species of this family are dependent on rainfall, and now they are found around agricultural areas and around sewage treatment plants.

Bufotes sitibundus (Pallas, 1771) (Fig. 3)
Variable Green Toad

Previous records: Al Wafrah (Sey & Al-Ghaith 2000) as *Bufo viridis*.

New records: Abdali, Al Jahrah Farms, Sulaibiya Pivot Fields, Bodai's Farm.

Remarks: The green toad is very common at Al Jahrah Nature Reserve. The taxonomy of the genus *Bufotes* is still not fully resolved. Previously, populations of the Eastern Mediterranean were referred to the *variabilis* complex (Dufresnes et al. 2019).



Fig. 3. The Variable Green Toad, *Bufotes sitibundus* (Photo by A. Alenezi).

Reptiles

Marine Turtles

Five species of marine turtles in two families (Cheloniidae and Dermochelyidae) are known to occur in the Kuwait waters (Gasperetti et al. 1993; Al-Muhanna & Meakins 2000b; Bishop et al. 2007; Al-Mohanna & Meakins

2000; Al-Mohanna et al. 2013; Rees et al. 2018). The Green Turtle, *Chelonia mydas* is considered as the most common species in the Arabian Gulf.

Family Cheloniidae

Caretta caretta (Linnaeus, 1758)
Loggerhead Turtle

Previous records: Shuaiba Industrial Area (Al-Mohanna & Meakins 2000)

Remarks: The Loggerhead Turtle is a rare species in the Kuwaiti waters. It was reported once by Al-Mohanna & Meakins (2000) from the water near Shuaiba Industrial Area. Masirah Island, Oman, hosts the largest nesting aggregations worldwide, with thousands of individual turtles frequenting the island for nesting on yearly base (Ross & Barwani 1982).

Chelonia mydas (Linnaeus, 1758) (Fig. 4A)
Green Turtle

Previous records: Kuwaiti waters (Eissa & El Assy 1975), Doha area (Al-Mohanna & Meakins 2000), Umm Al-Maradim and Qaruh islands (Al-Mohanna et al. 2013).

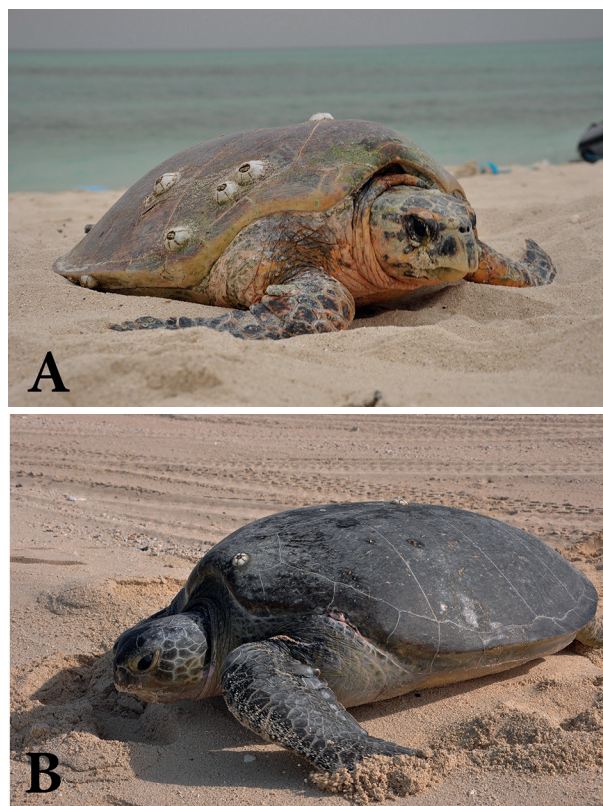


Fig. 4. Marine turtles of Saudi Arabia. **A.** *Eretmochelys imbricata*. **B.** *Chelonia mydas* (Photos by A. Al Mansi).

Remarks: This species was found to nest around Umm Al-Maradim and Qaruh islands (Al-Mohanna et al. 2013; Rees et al. 2018). Gasperetti et al. (1993) included a map showing several nesting sites in the Arabian Gulf on the coast of Saudi Arabia and the United Arab Emirates.

Eretmochelys imbricata (Linnaeus, 1766) (Fig. 4B)
Hawksbill Turtle

Previous records: Shuaiba Industrial Area (Al-Mohanna & Meakins 2000)

Remarks: This is a rare species in the Kuwaiti waters. Few individuals were found to nest in Kuwait (Rees et al. 2018). Gasperetti et al. (1993) stated that this a rare species in the Arabian Gulf with nesting populations around the coasts of Saudi Arabia.

Lepidochelys olivacea (Eschscholtz, 1829)
Olive Ridley Turtle

Previous records: NW Kubber Island (Bishop et al. 2007).

Remarks: So far this is the only record for Kuwait (Bishop et al. 2007). The Olive Ridley Turtle is considered as a pan tropical turtle of Atlantic and the Indo-Pacific oceans (Gasperetti et al. 1993). Tollab et al. (2015) gave recent observations for this species in the Arabian Gulf including records from Iran and Bahrain.

Family Dermochelyidae

Dermochelys coriacea (Vandelli, 1761)
The Leatherback Turtle

Previous records: Benadier, S Kuwait (Al-Muhanna & Meakins 2000b).

Remarks: This is a rare species in the Arabian Gulf and the Arabian Sea (Gasperetti et al. 1993). A dying specimen was collected from Benadier, S Kuwait (Al-Muhanna & Meakins 2000b).

Family Gekkonidae

This family is represented by six genera (*Bunopus*, *Cyrtopodion*, *Hemidactylus*, *Pseudoceramodactylus*, *Stenodactylus* and *Trigonodactylus*), including nine species. All species reported from Kuwait are eremic species known across Arabia. Species of the genus *Stenodactylus* were revised at the molecular level, including specimens from Kuwait (Metallinou et al. 2012).

Bunopus tuberculatus Blanford, 1874 (Fig. 5A)
Baluch Rock Gecko

Museum specimens: BMNH 1972.713-715, Kuwait, leg. A d'A Bellairs. BMNH 1972.354-358, Kuwait, leg.

K Blackwell. BMNH 1976.1714, 1976, Kuwait, leg. D. McIntyre. BMNH 1978.2067, 1978, Kuwait, leg. S. M. Eissa. BMNH 1985.1161-1164, Auhha Island.

FMNH 190984, Kuwait, leg. M. Kaiser, M. Al-Taqi, S. Issa, & K. Behbehani.

USNM 581915, 9.4.2014, Al Jahrah, 16 km W of Ali Al Salem Air Base.

LSUMZ-Herps 88942, 89494, 89496-97, and 89499, 2.2.2005, Mahboula (Al Ah'madi Governorate), leg. J. Bishop. LSUMZ-Herps 89502, 13.3.2005, Al Ah'madi Governorate, leg. J. Bishop.

Previous records: Auhha and Kubbar islands (Eissa & El Assy 1975), Al Wafrah (Al-Khalifa et al. 2012).

New records: Al Jahrah East Outfall, around Kated Reserve, Khwaisat, Mina Al Zour, Sabah Al-Ahmad Natural Reserve.

Remarks: This common species in Kuwait was recorded from several localities (Eissa & El Assy 1975; Al-Khalifa et al. 2012). It is widespread across the Middle East extending as far east as Pakistan (Sindaco & Jeremčenko 2008).

Cyrtopodion scabrum (Heyden, 1827) (Fig. 5B)
Rough Bent-toed Gecko

Museum specimens: BMNH 1972.1311, 1972, Kuwait, leg. A. d'A Bellairs. BMNH 1985.1165, Auhha Island, leg. A. d'A Bellairs.

USNM Amphibians & Reptiles 581744, 15.4.2014, Ali Al Salem Air Force Base (Al Jahrah Governorate).

Previous records: Jal Az Zour, Gabed (=Kated) (Eissa & El Assy 1975).

New records: Al Jahrah Farms, Jahrah East Outfall, Al Wafrah Farms, south Subahiya,

Remarks: The Rough Bent-toed Gecko is widespread across Egypt and the Middle East extending as far east as India (Sindaco & Jeremčenko 2008). This is a common species that occupies houses. More than 30 individuals were observed at south Subahiya, a place with ample bushes and water.

Hemidactylus flaviviridis Rüppell, 1840 (Fig. 5C)
Yellow-belly Gecko

Museum specimens: BMNH 1978.2068, 1978, Kuwait, leg. S.M. Eissa. BMNH 1985.1166, Auhha Island.

Previous records: Kuwait (Eissa & El Assy 1975).

New records: Abdali, Al Jahrah Farms, Al Wafrah Farms, Kated Reserve.

Remarks: This a widespread species distributed across Egypt to Eritrea in Africa, to the Arabian Peninsula, Iraq reaching as far as India (Sindaco & Jeremčenko 2008). This is the largest gecko in Kuwait. It is frequently observed at night on walls inside houses hunting insects and spiders. It is very common in houses, usually seen near florescent lights on buildings. Over the years and



Fig. 5. Some geckos of Kuwait. **A.** *Bunopus tuberculatus* (Photo by A. Alenezi). **B.** *Cyrtodactylus scabrum* (Photo by A. Alenezi). **C.** *Hemidactylus flaviviridis* (Photo by A. Alenezi). **D.** *Hemidactylus persicus* (Photo by A. Alenezi). **E.** *Stenodactylus affinis* (Photo by A. Alenezi). **F.** *Stenodactylus doriae* (Photo by A. Al Yousef). **G.** *Trigonodactylus arabicus*.

based on field observations by one of the authors (A. Al Sirhan), it is believed that *Hemidactylus flaviviridis* has displaced *Hemidactylus persicus* in newly developed areas in Kuwait.

Hemidactylus persicus Anderson, 1872 (Fig. 5D)
Persia Leaf-toed Gecko

Museum specimens: BMNH 1972.716, Kuwait, leg. A. d'A Bellairs.

Previous records: Kuwait (Eissa & El Assy 1975)

Remarks: It seems that the record of *Hemidactylus turcicus* by Eissa & El Assy (1975) was considered to be *Hemidactylus persicus* by Sindaco & Jeremčenko (2008) as shown by their distribution map for *H. persicus*. The distribution of the Turkish Gecko *Hemidactylus turcicus* is confined to Turkey and southern Europe (Greece, Italy and Spain) (Moravec et al. 2011). Castilla et al. (2013) gave a detailed distribution map for *H. persicus*, covering S Iran, Iraq, Saudi Arabia, N Oman, United Arab

Emirates, Bahrain, Kuwait, Qatar, Pakistan and N India, along with its habitat preference in Qatar. This species is probably becoming rare or even extinct in Kuwait. It was not found in Kuwait despite extensive search by one of the authors (A. Al Sirhan), but may still exist in the old houses in Kuwait City.

Stenodactylus affinis (Murray, 1884) (Fig. 5E)
Murray's Comb-fingered Gecko

Museum specimens: BEV.10036, 500 m W of Sulai-bikhat Reserve, W. Kuwait City. BEV.10095-98, Mina Said.

Previous records: Al Jahrah East Outfall, JEO (Al-Sirhan 2009), W Sulaibikhat Reserve, Mina Said (Metallinou et al. 2012).

New records: Al Dubaiya, Al-Nuwaiseeb.

Remarks: Al-Sirhan (2009) found that this species is the dominant gecko species in the Al Jahrah East Outfall, inhabiting areas with bushes of *Nitraria retusa*. This species is distributed throughout SE Iraq and Iran (Leviton et al. 1992).

Stenodactylus doriae Blanford, 1874 (Fig. 5F)
Middle Eastern Short-fingered Gecko

Museum specimens: BEV.10037, 13 km N-NE of Al Jahrah.

Previous records: Kuwait (Eissa & El Assy 1975), Al Wafrah (Al-Khalifa et al. 2012), Al Jahrah (Metallinou et al. 2012).

New records: Al Abraq, Al Ritqa.

Remarks: This is a rather common species that is widely distributed across the arid habitats of the Middle East (Sindaco & Jeremčenko 2008).

Stenodactylus slevini Haas, 1957
Slevin's Short-fingered Gecko

Museum specimens: BEV.10065, Sabah Al-Ahmad Natural Reserve. BEV.T1501, Ratqa, Kuwait-Iraq borders.

LSUMZ-Herps 88944, 2.2.2005, Mahboula (Al Ah'madi Governorate), leg. J. Bishop. LSUMZ-Herps 89505, 24.7.2004, Mahboula, 0.5km SW of Fintas Towers (Al Ah'madi Governorate), leg. J. Bishop. LSUMZ-Herps 89506, 11 9.2004, Mahboula (Al Ah'madi Governorate), leg. J. Bishop.

USNM 129877-78, 1951, S of Kuwait.

Previous records: Kuwait (Eissa & El Assy 1975), Sabah Al-Ahmad Natural Reserve, Al Ritqa (Metallinou et al. 2012).

New records: Al-Salmi.

Remarks: Slevin's Short-fingered Gecko was found in sandy areas in Kuwait. It is widespread across Bahrain, S Jordan, S Iraq, Kuwait, Qatar, NW Saudi-Arabia, W

United Arab Emirates and Yemen (Sindaco & Jeremčenko 2008).

Pseudoceramodactylus khobarensis Haas, 1957
Gulf Short-fingered Gecko

Museum specimens: BEV.10039-40, Al Wafrah Farms, 20 km E of Al Wafrah.

Previous records: Al Jahrah East Outfall, Al Ritqa Police Station, Al Subiya (Al-Sirhan 2009), Al Wafrah (Metallinou et al. 2012).

Remarks: This species was recorded from Kuwait by Al-Sirhan (2009). Metallinou et al. (2012) updated the distribution map of the Gulf Short-fingered Gecko in the eastern Arabian Peninsula and Iran. It was recorded from Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, United Arab Emirates and S Iran. Valdeón et al. (2013) stated that this species was found to inhabit coastal areas in Qatar, but also was found on inland sabkhas.

Trigonodactylus arabicus (Haas, 1957) (Fig. 5G)
Web-footed Sand Gecko

Museum specimens: BEV.10042-43, Al Wafrah Farms, 20 km E of Al Wafrah.

Previous records: Agriculture Research Station (Delima & Al-Nasser 2007)

Remarks: This species was recorded by Delima & Al-Nasser (2007) for the first time in Kuwait. Its distribution ranges across eastern Arabia including Saudi Arabia, Qatar, United Arab Emirates, S Oman, Bahrain and east to Iran (Sindaco & Jeremčenko 2008).

Family Agamidae

Five species within three genera (*Phrynocephalus*, *Trapelus*, and *Uromastix*) were recorded from Kuwait. The Egyptian Spiny-tailed Lizard, *Uromastix aegyptia*, is a species of special conservation importance.

Phrynocephalus arabicus (Anderson, 1894) (Fig. 6A)
Arabian Toadhead Agama

Previous records: Al Atraf, Kabed, Umm Niqa (Al-Sirhan & Brown 2010).

New records: Al Abatih, Al Sugaihia.

Remarks: The taxonomic status of the *Ph. arabicus* is complex, requiring further evaluation of the populations in eastern Arabia. Melnikov et al. (2014) showed that at least three species of this complex occur within the Arabian Peninsula; *Phrynocephalus arabicus sensu stricto* for the southern Arabian populations, *Phrynocephalus nejdensis* for the north-western Arabia populations including southern Jordan, and *Phrynocephalus macropeltis* representing the populations in eastern coastal Arabia. *Phrynocephalus maculatus* Anderson, 1872 (Fig. 6B)



Fig. 6. Agamids of Kuwait. **A.** *Phrynocephalus arabicus*. **B.** *Phrynocephalus maculatus* (Photo by A. Alenezi). **C.** *Trapelus agnetae* (Photo by A. Alenezi). **D.** *Trapelus persicus* (Photo by A. Alenezi).

Phrynocephalus maculatus Anderson, 1872
Blacktail Toadhead Agama

Museum specimens: BMNH 1973.472, Kuwait, leg. K. Blackwell. BMNH 1978.2070-2071 Kuwait, leg. S.M. Eissa. BMNH 1985.1167, Auhha Island.

Previous records: Al Ah'madi and Burgan hills, Jal Az Zour (Eissa & El Assy 1975), Khiran (Al-Sirhan & Brown 2010).

New records: Sabah Al-Ahmad Natural Reserve.

Remarks: This is a common species associated with vegetated mixed sand and gravel areas. Al-Sirhan & Brown (2010) gave an account on its presence in Kuwait. It was reported from SE Al-Samawa, Iraq on shrubs or buried in the soil (Al-Barazengy 2014). It was also observed in coastal area east to Sabah Al-Ahmad Natural Reserve.

Trapelus agnetae (Werner, 1929) (Fig. 6C)

New records: Al Liyah Reserve, Al Ritqa, Al Salmi.

Remarks: This species is known to occur across Jordan, Iraq, N Saudi Arabia and Kuwait (Arnold 1986; Sindaco & Jeremčenko, 2008).

Trapelus persicus (Blanford, 1881) (Fig. 6D)

Museum specimens: BMNH 1978.1000, 1978, Kuwait, leg. S.M. Eissa. BMNH 1970.1922-1926, Kuwait city, leg. A. d'A Bellairs.

LSUMZ-Herps 44766, 18.2.1983, Al Jahrah Governorate, leg. J. Bishop. (listed as *Trapelus blanfordi*).

Previous records: Al Jalia, Al Wafrah, Gabed (=Kabad) (Eissa & El Assy 1975), Umm Niqa (Cloudsley-Thompson 1979).

New records: Sulaibikhat, Zayed Reserve.

Remarks: Rastegar-Pouyani (2000) synonymized *T. persicus* with *T. ruderatus*. For nomenclature stability Ananjeva et al. (2013) adopted *T. persicus* to describe what was originally known as *T. persicus* for the Middle East. This is a common species in Kuwait with several records. It is found along coastal areas, but not in true desert west or north of Kuwait.

Uromastix aegyptia (Forskål, 1775) (Fig. 7)
Egyptian Spiny-tailed Lizard

Museum specimens: BMNH 1971.749, 1971, Kuwait, leg. A. d'A Bellairs. BMNH 1978.2072, 1978, Kuwait, leg. S. M. Eissa.

LSUMZ-Herps 88937 and 88939, 2.2.2005, Mahboula (Al Ah'madi Governorate), leg. J. Bishop. LSUMZ-Herps 88940, 26.10.2004, Mahboula (Al Ah'madi Governorate), leg. J. Bishop. LSUMZ-Herps 88941, 13.3.2005, Mahboula (Al Ah'madi Governorate), leg. J. Bishop. LSUMZ-Herps 89513-16, 13.3.2005, Mahboula (Al Ah'madi Governorate), leg. J. Bishop. LSUMZ-Herps 89519, 2.2.2005, Mahboula (Al Ah'madi Governorate), leg. J. Bishop. LSUMZ-Herps 89520 and 89522,



Fig. 7. The Egyptian Spiny-tailed Lizard, *Uromastix aegyptia* (Photo by A. Ragab).

17.11.2005, Mahboula, 1km SW Fintas Towers (Al Ah'madi Governorate), leg. J. Bishop.

Previous records: Al Mutla, Al Wafrah, Al Atrah, Kathma, Rhawdatain (Eissa & El Assy 1975), Desert around Kuwait City (Sey & Al-Ghaith 2000), Al Wafrah (Al-Khalifa et al. 2012), Al Liyah (Al Jahrah Governorate) and Kabad (Farwaniyah Governorate) (Al-Sayegh 2017).

New records: Al Salmi.

Remarks: The Spiny-tailed Lizard *Uromastix aegyptia* is a common species in the arid habitats of Kuwait as recorded above. Food plants consumed by this species were studied by Robinson (1995). Wilms & Böhme (2007) revised the distribution and systematics of lizards of the genus *Uromastix* in Arabia, including Kuwait. Al-Sayegh (2017) conducted a comprehensive study of the eco-physiological (body mass, tail volume, body temperature, and active hours) implications for conservation of this species in two protected and two non-protected locations in Kuwait. This species has a special conservation value since it is captured and traded in Kuwait and in Saudi Arabia where its populations are declining (Aloufi et al. 2019).

Family Trogonophidae

This family is represented by a single species in Kuwait. The Zarudny's Worm Lizard *Diplometopon zarudnyi* was reported from several localities across Kuwait.

Diplometopon zarudnyi Nikolsky 1907 (Fig. 8A)
Zarudny's Worm Lizard

Museum specimens: AMNH 134244-46, Kuwait.

BMNH 1977.356, 1977, Kuwait, leg. A. d'A Bellairs. BMNH 1977.770, 1977, Kuwait, leg. A. d'A Bellairs. BMNH 1978.1313, 1978, Kuwait, leg. A. d'A Bellairs. BMNH 1978.2080, 1978, Kuwait, leg. S. M. Eissa. BMNH 1980.188-189, 1980, Kuwait, leg. A. d'A Bellairs. BMNH 1983.1284-1285, 1983, Kuwait, leg. A. d'A Bellairs.

FMNH (Amphibians & Reptiles) 263890, 24.7.1972, Kuwait.

LSUMZ-Herps 44767-68, 26.7.1984, Wadi Al-Tilha (Al Jahrah Governorate), leg. J. Bishop. – LSUMZ-Herps 88933, 2005.5.5, Mahboula (Al Ah'madi Governorate), leg. J. Bishop. LSUMZ-Herps 89528-29, 1.5.1986, Shiggat Ai-Awazin (Al Jahrah Governorate), leg. J. Bishop. LSUMZ-Herps 89530, 2.5.1986, Shiggat Ai-Awazin, (Al Jahrah Governorate), leg. J. Bishop. LSUMZ-Herps

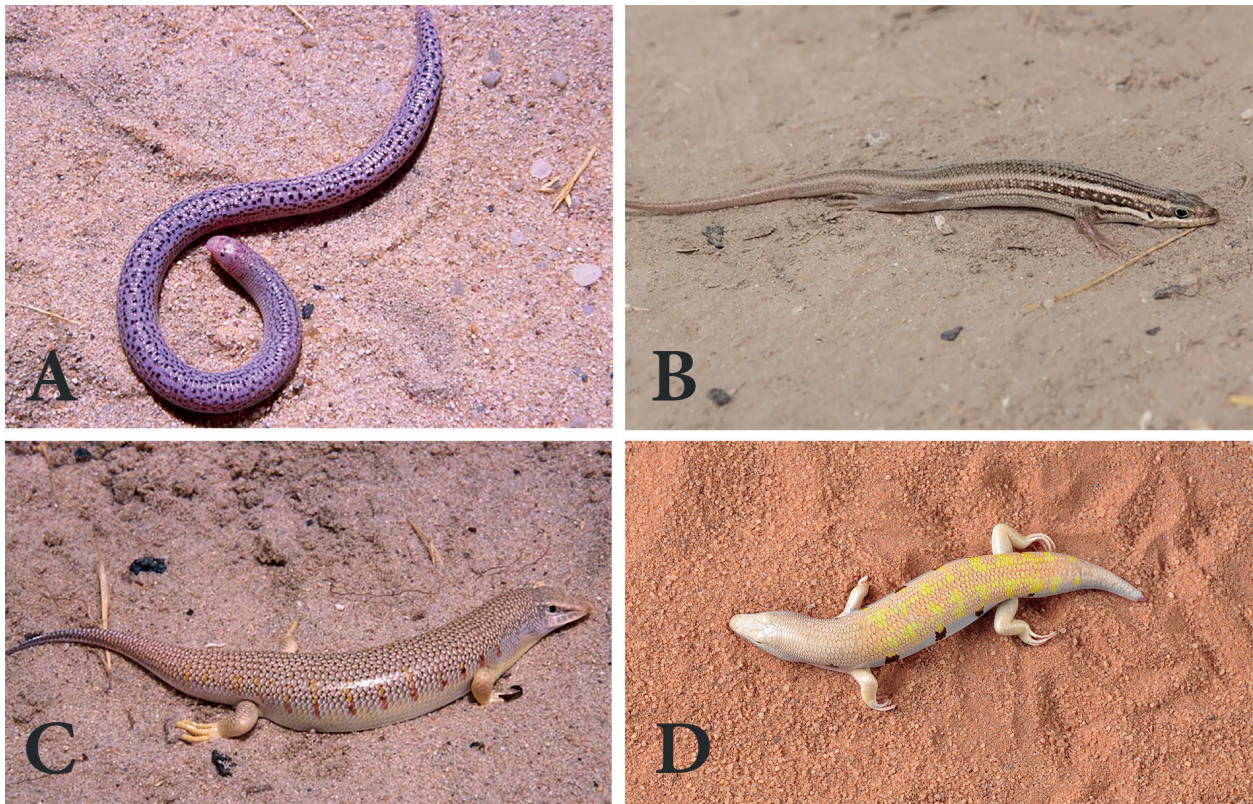


Fig. 8. Worm Lizard and skinks of Kuwait. **A.** *Diplometopon zarudnyi* (Photo by A. Alenezi). **B.** *Ablepharus pannonicus* (Photo by A. Alenezi). **C.** *Scincus mitranus* (Photo by A. Alenezi). **D.** *Scincus scincus*.

89531, 18.4.1986, Al Wafrah area (Al Ah'madi Governorate), leg. J. Bishop. LSUMZ-Herps 89532, 9.3.1989, Ras Salmiya (0.5km SSW Ras Al-Ardh), ('Hawalli Governorate), leg. J. Bishop.

LACM-Herps 186768, 22.5.2016, Ahmad Al Jaber Air Base, leg. S. White.

SM 64516, 18.5.1967, 10 miles away of the Shuaiba Coast.

FLMNH-Herp 68567, 30.11.1977, Kuwait, leg. C. Gans.

Previous records: Kuwait (Eissa & El Assy 1975)

New records: Al Shlallal Farm, Al Subiya.

Remarks: This is a common species in Kuwait with several records. It is a burrowing species, distributed throughout eastern and central Arabia, W Iran and S Iraq (Sindaco & Jeremčenko 2008).

Family Scincidae

The skinks of Kuwait are exemplified in four species representing three genera (*Ablepharus*, *Chalcides* and *Scincus*). Species of the genus *Scincus* are strictly sand-dwelling species. Arnold & Leviton (1977) revised the species of the genus *Scincus* in Arabia.

Ablepharus pannonicus (Fitzinger, 1824) (Fig. 8B)
Asian Snake-eyed Skink

New records: Al Jahrah Farms, Abdali Farms.

Remarks: The only previously available documentation of this species is based on an image depicted by Clayton & Pilcher (1983) without a specific locality. Specimens were found under the dry palm leaves in different locations. It is a common species at Al Jahra farms.

Chalcides ocellatus (Forskål, 1775)
Ocellated (Bronze) Skink

Museum specimens: BMNH 1978.2079, 1978, Kuwait, leg. S.M. Eissa.

Remarks: This species was not listed by Eissa & El Assy (1975). It is widely distributed through southern Italy to the Middle East, to North Africa and the Sahara, eastwards to India (Sindaco & Jeremčenko, 2008).

Scincus mitranus Anderson, 1871 (Fig. 8C)
Arabian Sand Skink

Museum specimens: BMNH 1976.1859, 1976, Kuwait, leg. I. Said.

Remarks: A specimen from Kuwait was depicted by Arnold & Leviton (1977). Its distribution is confined to south and east Arabia, including Saudi Arabia, Oman, Qatar, United Arab Emirates, and Yemen (Arnold & Leviton 1977).

Scincus scincus (Linnaeus, 1758) (Fig. 8D)
Sandfish Skink

Museum specimens: BMNH 1972.1311, 1972, Kuwait, leg. K. Blackwell.

Previous records: Al Jalia (Eissa & El Assy 1975), Kuwait (Arnold & Leviton 1977).

New records: Al Sugaihia, Kabed Reserve.

Remarks: Previously recorded from Kuwait (Eissa & El Assy 1975; Arnold & Leviton 1977). This is a sand dwelling species distributed across eastern Arabia and Iran (Arnold & Leviton 1977).

Family Lacertidae

Six species of lacertids occur in Kuwait, belonging to two genera, *Acanthodactylus* and *Mesalina*. The systematics of the species belonging to the genus *Acanthodactylus* were revised by Salvador (1982) and at the molecular level by Tamar et al. (2016). Sindaco et al. (2018) revised the *Mesalina guttulata* species complex from Arabia, but the status of *Mesalina* in Kuwait remains unresolved.

Acanthodactylus boskianus (Audouin, 1829) (Fig. 9A)
Bosk's Fringe-fingered Lizard

Previous records: Al Ah'madi, Al Jalia, Al Mutla, Al Wafrah, Kadma, Rhawdatain (Eissa & El Assy 1975)

New records: Al Abraq.

Remarks: This was a common species in Kuwait and was recorded from several localities (Eissa & El Assy 1975). It is distributed across North Africa, the Sahara, Sudan and Somalia to the Middle East (Salvador 1982). Nowadays, it is not common, and was only observed at Al Abraq (Personal observations by A. Al Sirhan).

Acanthodactylus opheodurus Arnold, 1980 (Fig. 9B)
Snake-tailed Fringe-toed Lizard

Museum specimens: BMNH 1964.97, Al Ah'madi, leg. D Vesey-Fitzgerald. BMNH 1972.360, 1973.101 (3 specimens), Kuwait. BMNH 1970.1927, City of Kuwait, leg. A d'A Bellairs.

Previous records: Kuwait, City of Kuwait (Salvador 1982).

New records: Al Jahrah East outfall, Jal Al-Zour, Khiran.

Remarks: This is a rather common species in the Arabian Peninsula, Jordan and Iraq (Sindaco & Jeremčenko 2008). It is common in the sand dunes near Khiran living besides the bushes of *Lycium shawii* and other halophyte shrubs.

Acanthodactylus schmidtii Haas, 1957 (Fig. 9C)
Schmidt's Fringe-fingered Lizard

Previous records: Al Ah'madi, Al Jalia, Al Mutla, Al Wafrah, Kadma, Rhawdatain (Eissa & El Assy 1975), Al Wafrah (Al-Khalifa et al. 2012).

New records: Al Subiya, N Bubiyan Bridge, Sabah Al-Ahmad Natural Reserve.

Remarks: This is a sand dwelling species distributed across the Arabian Peninsula, Jordan, SE Iraq, SW Iran (Sindaco & Jeremčenko 2008). It was collected from several localities in Kuwait (Eissa & El Assy 1975).

Acanthodactylus hardyi Haas, 1957 (Fig. 9D)
Hardy's Fringe-fingered Lizard

Museum specimens: BMNH 1964.123, Hawalli, leg. D. Vesey-Fitzgerald. BMNH 1972.361, City of Kuwait, leg. K. Blackwell. BMNH 1970.1928-1939, Kuwait city, leg. A. d'A Bellairs. BMNH 1978.2074-2076, 1978, Kuwait, leg. S. M. Eissa.

BEV.11053, 35 km SW. of Ratqa.

CAS 190901-2, 1970, Al Asimah, leg. A. d'A. Bellairs. LSUMZ-Herps 89533, 18.4.1986, Al Wafrah area (Al Ah'madi Governorate), leg. J. Bishop.

Previous records: Al Ah'madi, Al Jalia, Al Mutla, Al Wafrah, Kadma, Rhawdatain (Eissa & El Assy 1975), Al Wafrah (Al-Khalifa et al. 2012) as *Acanthodactylus scutellatus*.

New records: Al Ritqa, Al Salmi, Al-Sugaihia, Kadma.

Remarks: The status of this species remains unclear. It was originally described as a subspecies of *Acanthodactylus scutellatus* by Haas (1957). From a taxonomic point of view, several authorities considered *A. hardyi* as a member of the *scutellatus* group (Salvador 1982; Tamar et al. 2016). This is a common species in Kuwait inhabiting various habitats (Eissa & El Assy 1975). This species was a subject of several studies in Kuwait that investigated changed substrate preferences (Al-Hashem & Brain 2009a), and the effects of oil pollution on its body size, weight, emergence, basking and foraging behaviors (Hashem & Brain 2008; 2009a and b). This species occurs in Jordan, Iraq, Saudi Arabia, Kuwait (Tamar et al. 2016).



Fig. 9. Lacertids of Kuwait. A. *Acanthodactylus boskianus*. B. *Acanthodactylus opheodurus*. C. *Acanthodactylus schmidtii*. D. *Acanthodactylus scutellatus*. E. *Mesalina brevirostris*. F. *Mesalina guttulata*. (All Photos by A. Alenezi).

Mesalina brevirostris Blanford, 1874 (Fig. 9E)
Blanford's Short-nosed Desert Lizard

Museum specimens: BMNH 1970.1940-1941, Kuwait. BMNH 1972.362-364, Kuwait, leg. K Blackwell. BMNH 1978.2077-2078, 1978, Kuwait, leg. S.M. Eissa.

Previous records: Al Ah'madi, Al Jalia, Al Mutla, Al Wafrah, Kadma, Rhawdatain (Eissa & El Assy 1975), Al Wafrah (Al-Khalifa et al. 2012).

New records: Al Salmi, Al Ritqa, Failaka Island.

Remarks: This is a rather common species in Kuwait inhabiting gravelly deserts. It is distributed across North Africa, Sudan and Somalia to the Middle East (Sindaco & Jeremčenko 2008).

Mesalina guttulata (Lichtenstein, 1823) (Fig. 9F)
Small-spotted Desert Lizard

Previous records: Al-Salmi (Al-Sirhan 2008).

New records: Sabah Al-Ahmad Natural Reserve.

Remarks: This lizard was included in the herpetofauna of Kuwait by Al-Sirhan (2008), and was encountered at Sabah Al-Ahmad Natural Reserve. It is distributed across North Africa to the Middle East (Sindaco & Jeremčenko 2008).

Family Varanidae

One species of the family Varanidae was reported to occur in Kuwait. *Varanus griseus* is widely distributed across the Arabian Peninsula.

Varanus griseus (Daudin, 1803) (Fig. 10)
Desert Monitor

Museum specimens: USNM 129879, 1951, Kuwait, south of; along Persian Gulf strip. Voucher image, ZFMK, 14.5. 1998, Wirral Sabriya (=N Sabriya).

Previous records: Al Mutla, Rhawdatain (Eissa & El Assy 1975).

New record: Kated Nature Reserve, Tulha.

Remarks: The Desert Monitor is a common species in the Arabian Peninsula, distributed from North Africa, through arid parts of the Middle East, to reach as far as India (Sindaco & Jeremčenko 2008).

Previous records: Al Dbaiyyah, Al Jahrah, Al Jalia, Al Wafrah, Khwaisat (Eissa & El Assy 1975).

Remarks: This obligate parthenogenetic species is widespread with records from most of the world. It seems to be common in Kuwait, resulting from its introduction in plants imported in pots (Egan 2007).

Family Boidae

This family is represented by a single species. *Eryx jayakari*. It seems to be common throughout the country. In the Arabian Peninsula, two species were recorded, *Eryx jaculus* and *E. jayakari* (Egan 2007).



Fig. 10. The Desert Monitor, *Varanus griseus* (Photo by A. Ragab).

Family Typhlopidae

This family is represented by one species, *Indotyphlops braminus*. This Asian species is widespread and has become almost cosmopolitan in distribution.

Indotyphlops braminus (Daudin, 1803)
Brahminy blind Snake, Flowerpot Snake

Museum specimens: LSUMZ-Herps 88932, 15.10.2005, Rabiya (Farwaniyah Governorate), leg. J. Bishop.

Eryx jayakari Boulenger, 1888 (Fig. 11A)
Arabian Sand Boa

Museum specimens: BMNH 1972.366, Kuwait, leg. K Blackwell. BMNH 1978.2081, Kuwait, leg. S. M. Eissa. BMNH 1985.1168, Auhha Island.

CMNH-Herps 157129, 24.7.1972, Kuwait.

LSUMZ-Herps 89536, 22.6.2003, Al Wafrah New City (Al Ah'madi Governorate), leg. J. Bishop.

Previous records: Kuwait (Eissa & El Assy 1975).

New records: Al Ritqa, Subiya.



Fig. 11. Some snakes of Kuwait. **A.** *Eryx jayakari* (Photo by A. Alenezi). **B.** *Lytorhynchus diadema gaddi* (Photo by A. Alenezi). **C.** *Malpolon moilensis*. **D.** *Platyceps ventromaculatus* (Photo by A. Alenezi). **E.** *Spalerosophis diadema cliffordii*. **F.** *Cerastes gasperettii* (Photo by A. Alenezi).

Remarks: The Arabian Sand Boa is distributed across the eastern part of the Arabian Peninsula (Kuwait, Oman, Saudi Arabia, United Arab Emirates) Iraq and SW Khuzestan, Iran (Egan 2007).

Family Colubridae

The family Colubridae, *sensu lato*, includes the highest number of snake species with worldwide distribution. In

Kuwait it is represented by four species in four genera (*Dolichophis*, *Lytorhynchus*, *Platyceps* and *Spalerosophis*).

Dolichophis jugularis (Linnaeus 1758)

Large Whip Snake

Previous records: Doha (Al-Mohanna et al. 1997)

Remarks: This snake was reported from Doha, Kuwait (Al-Mohanna et al. 1997). In southern Iraq, it was found in Al-Kufa district (Rhadi et al. 2017). This species is common in Jordan, Lebanon, Palestine, Syria and Turkey (Amr & Disi 2011).

Lytorhynchus diadema gaddi (Nikolsky, 1907) (Fig. 11B)

Crowned Leafnose Snake

Previous records: Al Jalia, Al Jahrah, Al Wafrah (Eissa & El Assy 1975), Kuwait (Meakins & Al-Mohanna 2003).

New records: Al Ritqa.

Remarks: Shafiei et al. (2015) showed that *L. d. gaddi* occurs to the west of Iran with localities bordering Iraq. This snake is associated with loose soil, especially sand. *Platyceph ventromaculatus* (Gray, 1834) (Fig. 11D)

Platyceph ventromaculatus (Gray, 1834)

Glossy-bellied Racer

Museum specimens: BMNH 1947.3.2.30-32, Kuwait, leg. D.V. Dickson.

USNM 581743, ♂, 15.4.2014, Ali Al Salem Air Force Base (Al Jahrah Governorate).

Previous records: Al Jalia (Eissa & El Assy 1975).

New records: Judailiyat, Kated Reserve.

Remarks: Schätti (2006) referred to the populations of this species inhabiting Iraq, Kuwait and Saudi Arabia as *Platyceph cf. ventromaculatus*.

Spalerosophis diadema cliffordii (Schlegel, 1837) (Fig. 11E)

Spalerosophis diadema cliffordii (Schlegel, 1837)

Clifford's Royal Snake

Museum specimens: BMNH 1972.367, Kuwait, leg. K. Blackwell.

Previous records: Al Atrah, Al Jalia (Eissa & El Assy 1975).

New records: Amgara, Mula'a farm, Sabah Al-Ahmad Natural Reserve.

Remarks: The Clifford's Royal Snake has a wide range of distribution extending from North Africa to western Iran, southern Turkey to the Arabian Peninsula (Amr & Disi 2011). This is an aggressive snake inhabiting arid regions.

Family Psammophiidae

This family includes two species in two genera (*Rhagerhis* and *Psammophis*). Both species are desert adapted species.

Rhagerhis (Malpolon) moilensis (Reuss, 1834) (Fig. 11C)

Moila Snake

Museum specimens: BMNH 1972.368-69, Kuwait, leg. K. Blackwell. BM1978.2082, Kuwait, leg. S. M. Eissa.

LSUMZ-Herps 89508, 19.1.2005, Al Ah'madi Governorate, leg. J. Bishop.

Previous records: Al Jalia (Eissa & El Assy 1975).

New records: Sabah Al-Ahmad Reserve.

Remarks: This is a diurnal snake inhabiting gravelly deserts. It is distributed in Algeria, Egypt, and Sudan to Southwest Asia including southwestern Iran (Amr & Disi 2011).

Psammophis schokari (Forskål, 1775)

Forskål's Sand Snake

Previous records: Al Jahrah, Al Wafrah (Eissa & El Assy 1975)

Remarks: This is a common snake inhabiting arid habitats as well as temperate Mediterranean areas. Its distribution extends from North Africa to India and Syria to the Arabian Peninsula (Amr & Disi 2011).

Family Viperidae

This family includes one species of the genus *Cerastes*. This genus is widespread across the deserts of northern North Africa eastward through Arabia and to Iran, with three species; *Cerastes gasperettii*, *Cerastes cerastes* and *Cerastes vipera* (Sindaco et al. 2013).

Cerastes gasperettii Leviton & Anderson, 1967 (Fig. 11F)

Museum specimens: BMNH 1947.3.2.34, Abraj Khaitan, 8 miles S. of Kuwait, leg. Dr. H. Dickson. BMNH 1967.2200, Al Jahrah, leg. D. Vesey-Fitzgerald. BMNH 1972.371-372, Kuwait, leg. K. Blackwell. BMNH 1978.2085, Kuwait, leg. S.M. Eissa. BMNH 1985.1172, Auhha Island.

USNM 129881, 1951, Kuwait, S of, along Persian Gulf strip.

Previous records: Al Ah'madi, Al Jalia, Jal Az Zour, Kadma (Eissa & El Assy 1975)

New records: outside Kated Reserve, Rawdatain, Subiya.

Remarks: This is a psammophile species known across the sand areas of the Arabian Peninsula, southern Iraq and Jordan (Gaspereti 1988; Amr & Disi 2011; Rhadi et al. 2017). An illustrated guide to the horned viper of Kuwait was published by Al-Fares and Al-Metairie (2014) with a series of photographs.

Family Elapidae

Subfamily Hydrophiinae

Ten species of sea snakes have been recorded from the Arabian Gulf (Rezaie-Atagholipour et al. 2016; Castilla et al. 2017; Buzás et al. 2018). Within the Kuwaiti waters, the presence of four species is confirmed. Rezaie-Atagholipour et al. (2016) presented a comprehensive account on the sea snakes of the Arabian Gulf including identification keys and illustrations.

Hydrophis cyanocinctus Daudin, 1803 (Fig. 12A)
Annulated Sea Snake

Museum specimens: BMNH 1978.2083, 1978, Kuwait, leg. S. M. Eissa.

LSUMZ-Herps 43335, ♂, 20.6.1983, Kuwait, leg. J. Bishop. LSUMZ-Herps 98341, 26.9.2004, Station BUB-02 of Boubyan Project (Al Jahrah Governate), leg. J. Bishop.

Previous records: Kuwait (Eissa & El Assy 1975).

Remarks: The Annulated Sea Snake is known from the Indo-West Pacific, from the Arabian Gulf to Japan (David and Ineich 1999). Within the Arabian Gulf, it was recorded from the waters of all Gulf States (Castilla et al. 2017).

Hydrophis lapemoides (Gray, 1849) (Fig. 12B)
Persian Gulf Sea Snake

Museum specimens: LSUMZ-Herps 43336, ♀, 20.6.1983, Kuwait, leg. J. Bishop.

Remarks: This snake occurs across the Indian Ocean, extending from the Arabian Gulf to Malay Archipelago (Rasmussen 1987; Rezaie-Atagholipour et al. 2016). Within the Arabian Gulf, it was recorded from the waters of all Gulf States (Castilla et al. 2017). This museum record represents the first documentation of the Persian Gulf Sea Snake from the Kuwaiti waters.

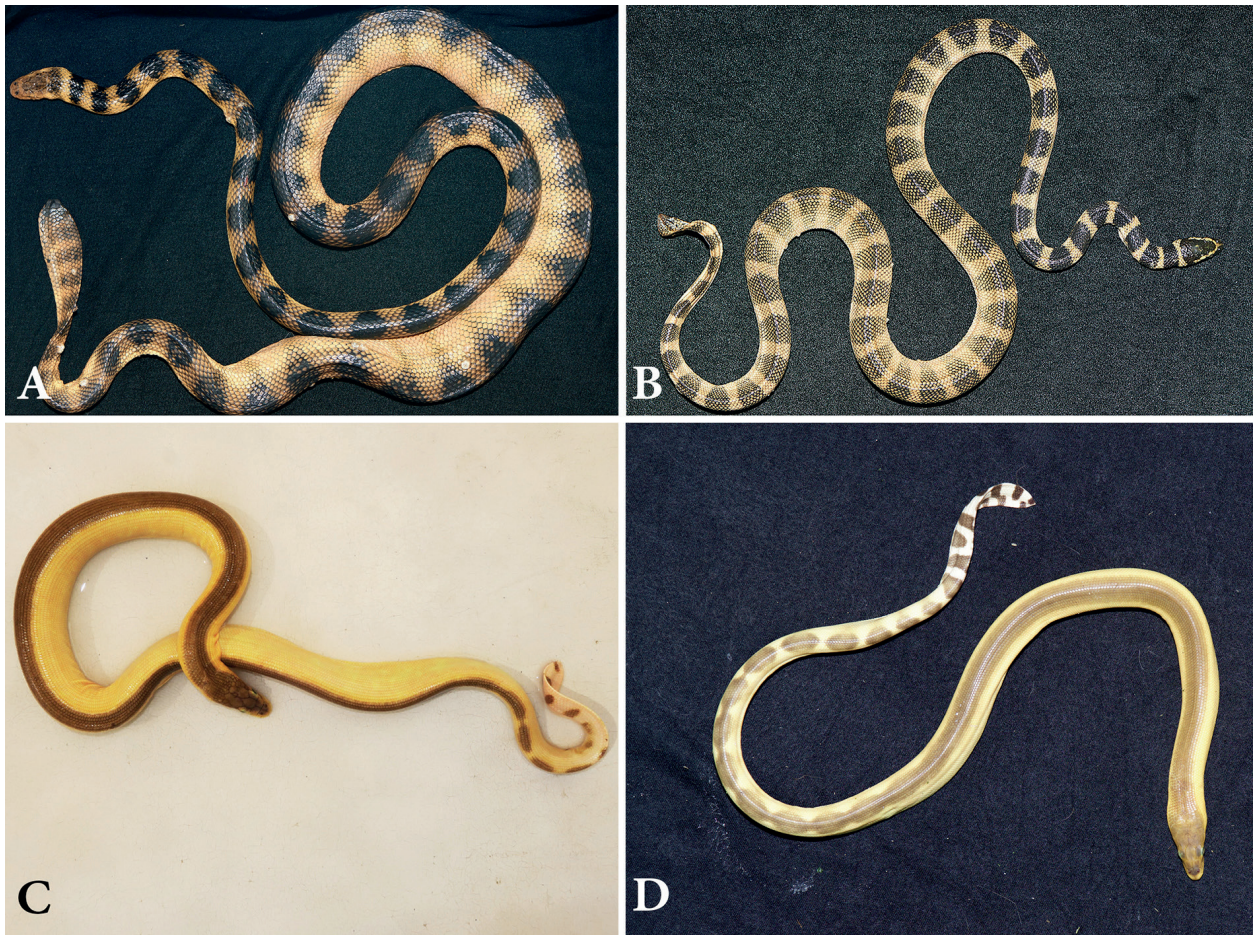


Fig. 12. Sea snakes of Kuwait. **A.** *Hydrophis cyanocinctus* (Photo by Csaba Géczy). **B.** *Hydrophis lapemoides* (Photo by Csaba Géczy). **C and D.** *Hydrophis platurus* (Photo by Balazs Buzas -balazsbuzas.com).

Hydrophis platurus (Linnaeus, 1766) (Fig. 12C–D)
Yellow-bellied Sea Snake

Museum specimens: BMNH 1978.2084, 1978, Kuwait, leg. S. M. Eissa.

LSUMZ-Herps 89540, ♀, 21.6. 1995, Salmiya, Kuwait Bay, 2.8 km W. of Ras-Al-Ardh, leg. J. Bishop. LSUMZ-Herps 89541, 27.11.1993, Failaka Island near Auha Island, leg. J. Bishop.

Previous records: Kuwait (Eissa & El Assy 1975).

Remarks: The Yellow-bellied Sea Snake occurs across the Indo-Pacific, from east and south of Africa as far as the western coasts of North and South America (Heatwole 1999). Within the Arabian Gulf, it was recorded from the waters of all Gulf States (Castilla et al. 2017).

Hydrophis viperina (Schmidt, 1852)
Viperine Sea Snake

Museum specimens: LSUMZ-Herps 43338, ♀, 24.5.1983, Kuwait, leg. J. Bishop.

Remarks: This sea snake occurs in the Indian Ocean, extending from the Arabian Gulf to the Malay Archipelago (David & Ineich 1999). Within the Arabian Gulf, it was recorded from the waters of Bahrain, Qatar, Saudi Arabia, and the United Arab Emirates (Castilla et al. 2017; Buzás et al. 2018). This museum record represents the first documentation of the Viperine Sea Snake from the Kuwaiti waters.

DISCUSSION

Eissa & El Assy (1975) reported a total of 28 species of reptiles from Kuwait, however, three species may represent misidentifications (*Uromastix thomasi*, *Agama jayakari* and *Hemidactylus turcicus*). The first two species are known from Oman and eastern Arabia, while *H. turcicus* occurs in Turkey and southern Europe. The finding of *D. jugularis* in Kuwait by Al-Mohanna et al. (2007) represents its most southern range of distribution in its eastern range, and signifies a relict population. It was recorded from Al-Kufa district, southern Iraq (Rhadi et al. 2017).

The herpetofauna of Kuwait consists of three elements; Arabian species such as *Acanthodactylus opheodurus*, *Acanthodactylus schmidtii*, *Cerastes gasperettii*, *Diplometopon zarudnyi*, *Eryx jayakari* and *Scincus mitranus*, and to some extent Iranian and/or oriental species exemplified by *Platycephalus ventromaculatus*, *Phrynocephalus arabicus*, *Phrynocephalus maculatus*, and *Stenodactylus affinis*. Many other species have a wide range of distribution across North Africa to the Arabian Peninsula and beyond (e.g., *Acanthodactylus boskianus*, *Cyrtopodion scabrum*, *Varanus griseus* and *Uromastix aegyptia*). Some species represent extension range of eastern Ara-

bian forms such as *Hemidactylus persicus*, *Pseudoceramodactylus khobarensis* and *Trigonodactylus arabicus*.

Records of reptiles from two Kuwaiti islands are of special interest. *Bunopus tuberculatus* was found in both Auhha and Kubbar islands, while *Cyrtopodion scabrum*, *H. flaviviridis*, *Eryx jayakari*, *Phrynocephalus maculatus* and *Cerastes gasperettii* were collected from Auhha Island. Both islands (Kubbar and Auhha) are very small with an area of 0.11 and 0.35 km² respectively. Soorae (2004) reported nine species of reptiles (five geckos, one lizard and three snakes) from 13 islands in the Arabian Gulf belonging to the United Arab Emirate (UAE). He attributed the presence of these reptiles to anthropogenic activities. Bourquin (2011) recorded thirteen species of reptiles from Sir Bani Yas Island (UAE), including eight geckos, two skinks and three snakes. The reptiles of the Kuwaiti islands should be investigated both at the organismal and molecular levels.

Gaps in collecting areas are evident as indicated in Fig. 1. Very few or no data are available from the western and southwestern parts of Kuwait. The urgent priority is to conduct baseline herpetological surveys in the protected areas of Kuwait. Future studies should address the threats facing the reptiles in this fast developing country with urban and industrial expansion.

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Artikel/Article: [Reptiles and amphibians of the State of Kuwait 253-272](#)